



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Mario Z. Torresan</b>	<b>Project Number</b> <b>J0128</b>
<b>Project Title</b> <b>When Air Masses Collide</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective is to determine what happens when a warm air mass meets a cold air mass, by modeling air masses with water masses. I believe that a tornado will be formed.</p> <p><b>Methods/Materials</b> Materials for this experiment include a 10-gallon fish tank with a divider down the middle, hot water dyed red and cold water dyed blue, and a camera. The water masses were carefully poured simultaneously into each side of the fish tank, the divider was removed, and the waters were allowed to mix. Photos and video were taken at timed intervals, from t=0 minutes (min) to t=15 min. The photos and video were used to record and analyze the results. The experiment was run 4 times.</p> <p><b>Results</b> No tornado was produced. Instead, photography showed that the collision between hot and cold water resulted in violent waves and turbulence as the cold, more-dense water dived down under the hot, less-dense water. As the test progressed from t=0 to 15 min, the turbulence was high for the first minute, and the cold water moved rapidly back and forth across the tank in a wave. After the first minute the turbulence dropped dramatically and the contact between the cold and hot water grew smoother, yet never completely smoothed out even at t=15 min.</p> <p><b>Conclusions/Discussion</b> When air masses meet they form a boundary that separates them, which is called a front. Fronts are transition zones. Fronts are important to study because it's where major catastrophic weather events can occur. In my experiment I studied what might occur when cold air advances into warm air, hoping to see tornado-like features created when a body of cold water meets a body of hot water. Although I saw turbulence I didn't see tornado-like features. From the literature I learned a cold front occurs when a mass of cold air advances into a region of warmer air. The colder air is denser than warmer air so the cold air will push under and up through the warm air, causing the less dense, warm air to rise and create turbulence, which can result in violent weather.</p>	
<b>Summary Statement</b> The project focused on modeling what occurs when warm and cold air masses collide, by using warm and cold water masses to simulate warm and cold fronts.	
<b>Help Received</b> Parents helped me type and organize my report; mother helped me with my graph and graphics and arranging the pieces	